The Mastery of the Air

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- PREFACE
- PART I-BALLOONS AND AIR-SHIPS
  - CHAPTER I. Man's Duel with Nature
  - CHAPTER II. The French Paper-maker who Invented the Balloon
  - CHAPTER III. The First Man to Ascend in a Balloon
  - CHAPTER IV. The First Balloon Ascent in England
  - CHAPTER V. The Father of British Aeronauts
  - CHAPTER VI. The Parachute
  - CHAPTER VII. Some British Inventors of Air-ships
  - CHAPTER VIII. The First Attempts to Steer a Balloon
  - CHAPTER IX. The Strange Career of Count Zeppelin
  - CHAPTER X. A Zeppelin Air-ship and its Construction
  - CHAPTER XI. The Semi-rigid Air-ship
  - CHAPTER XII. A Non-rigid Balloon
  - CHAPTER XIII. The Zeppelin and Gotha Raids
- PART II. AEROPLANES AND AIRMEN
  - CHAPTER XIV. Early Attempts in Aviation
  - CHAPTER XV. A Pioneer in Aviation
  - CHAPTER XVI. The "Human Birds"
  - CHAPTER XVII. The Aeroplane and the Bird
  - CHAPTER XVIII. A Great British Inventor of Aeroplanes
  - CHAPTER XIX. The Wright Brothers and their Secret Experiments
  - CHAPTER XX. The Internal-combustion Engine
  - CHAPTER XXI. The Internal-combustion Engine(Cont.)
  - CHAPTER XXII. The Aeroplane Engine
  - CHAPTER XXIII. A Famous British Inventor of Aviation Engines
  - CHAPTER XXIV. The Wright Biplane (Camber of Planes)
  - CHAPTER XXV. The Wright Biplane (Cont.)
  - CHAPTER XXVI. How the Wrights launched their Biplane
  - CHAPTER XXVII. The First Man to Fly in Europe
  - CHAPTER XXVIII. M. Bleriot and the Monoplane
  - CHAPTER XXIX. Henri Farman and the Voisin Biplane
  - CHAPTER XXX. A Famous British Inventor
  - CHAPTER XXXI. The Romance of a Cowboy Aeronaut
  - CHAPTER XXXII. Three Historic Flights

- CHAPTER XXXIII. Three Historic Flights (Cont.)
- CHAPTER XXXIV. The Hydroplane and Air-boat
- CHAPTER XXXV. A Famous British Inventor of the Water-plane
- CHAPTER XXXVI. Sea-planes for Warfare
- CHAPTER XXXVII. The First Man to Fly in Britain
- CHAPTER XXXVIII. The Royal Flying Corps and Royal Naval Air Service
- CHAPTER XXXIX. Aeroplanes in the Great War
- CHAPTER XL. The Atmosphere and the Barometer
- CHAPTER XLI. How an Airman Knows what Height he Reaches
- CHAPTER XLII. How an Airman finds his Way
- CHAPTER XLIII. The First Airman to Fly Upside Down
- CHAPTER XLIV. The First Englishman to Fly Upside Down
- CHAPTER XLV. Accidents and their Cause
- CHAPTER XLVI. Accidents and their Cause (Cont.)
- CHAPTER XLVII. Accidents and their Cause (Cont.)
- CHAPTER XLVIII. Some Technical Terms used by Aviators
- CHAPTER XLIX. The Future in the Air

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PREFACE

This book makes no pretence of going minutely into the technical and scientific sides of human flight: rather does it deal mainly with the real achievements of pioneers who have helped to make aviation what it is to-day.

My chief object has been to arouse among my readers an intelligent interest in the art of flight, and, profiting by friendly criticism of several of my former works, I imagine that this is best obtained by setting forth the romance of triumph in the realms of an element which has defied man for untold centuries, rather than to give a mass of scientific principles which appeal to no one but the expert.

So rapid is the present development of aviation that it is difficult to keep abreast with the times. What is new to-day becomes old to-morrow. The Great War has given a tremendous impetus to the strife between the warring nations for the mastery of the air, and one can but give a rough and general impression of the achievements of naval and military airmen on the various fronts.

Finally, I have tried to bring home the fact that the fascinating progress of aviation should not be confined entirely to the airman and constructor of air-craft; in short, this progress is not a retord of events in which the mass of the nation have little personal concern, but of a movement in which each one of us may take an active and intelligent part.

I have to thank various aviation firms, airmen, and others who have kindly come to my assistance, either with the help of valuable information or by the loan of photographs. In particular, my thanks are due to the Royal Flying Corps and Royal Naval Air Service for permission to reproduce illustrations from their two publications on the work and training of their respective corps; to the Aeronautical Society of Great Britain; to Messrs. C. G. Spencer Sons, Highbury; The Sopwith Aviation Company, Ltd.; Messrs. A. V. Roe Co., Ltd.; The Gnome Engine Company; The Green Engine Company; Mr. A. G. Gross (Geographia, Ltd.); and M. Bleriot; for an exposition of the internal-combustion engine I have drawn on

in order to lessen the effects of a fall. The original shed was constructed on pontoons, and it could be turned round as desired, so that the air-ship could be brought out in the lee of any wind from whatsoever quarter it came.

It is said that the Count's private fortune of about L25,000 was soon expended in the cost of these works and the necessary experiments. To continue his work he had to appeal for funds to all his friends, and also to all patriotic Germans, from the Kaiser downwards.

At length, in 1908, there came a turning-point in his fortunes. The German Government, which had watched the Count's progress with great interest, offered to buy his invention outright if he succeeded in remaining aloft in one of his dirigibles for twenty-four hours. The Count did not quite succeed in his task, but he aroused the great interest of the whole German nation, and a Zeppelin fund was established, under the patronage of the Kaiser, in every town and city in the Fatherland. In about a month the fund amounted to over L300,000. With this sum the veteran inventor was able to extend his works, and produce air-ship after air-ship with remarkable rapidity.

When, war broke out it is probable that Germany possessed at least thirteen air-ships which had fulfilled very difficult tests. One had flown 1800 miles in a single journey. Thus the East Coast of England, representing a return journey of less than 600 miles was well within their range of action.

CHAPTER X. A Zeppelin Air-ship and its Construction

After the Zeppelin fund had brought in a sum of money which probably exceeded all expectations, a company was formed for the construction of dirigibles in the Zeppelin works on Lake Constance, and in 1909 an enormous air-ship was produced.

In shape a Zeppelin dirigible resembled a gigantic cigar, pointed at both ends. If placed with one end on the ground in Trafalgar Square, London, its other end would be nearly three times the height of the Nelson Column, which, as you may know, is 166 feet.

From the diagram here given, which shows a sectional view of a typical Zeppelin air-ship, we may obtain a clear idea of the main features of the craft. From time to time, during the last dozen years or so, the inventor has added certain details, but the main features as shown in the illustration are common to all air-craft of this type.

Zeppelin L1 was 525 feet in length, with a diameter of 50 feet. Some idea of the size may be obtained through the knowledge that she was longer than a modern Dreadnought. The framework was made of specially light metal, aluminium alloy, and wood. This framework, which was stayed with steel wire, maintained the shape and rigidity of her gas-bags; hence vessels of this type are known as RIGID air-ships. Externally the hull was covered with a waterproof fabric.

Though, from outside, a rigid air-ship looks to be all in one piece, within it is divided into numerous compartments. In Zeppelin L1 there were eighteen separate compartments, each of which contained a balloon filled with hydrogen gas. The object of providing the vessel with these small balloons, or ballonets, all separate from one another, was to prevent the gas collecting all at one end of the ship as the vessel travelled through the air. Outside the ballonets there was a ring-shaped, double bottom, containing non-inflammable gas, and the whole was enclosed in rubber-coated fabric.

The crew and motors were carried in cars slung fore and aft. The ship was propelled by three engines, each of 170 horse-power. One engine was placed in the forward car, and the two others in the after car.

To steer her to right or left, she had six vertical planes somewhat resembling box-kites, while eight horizontal planes enabled her to ascend or descend.

In Zeppelin L2, which was a later type of craft, there were four motors capable of developing 820 horse-power. These drove four propellers, which gave the craft a speed of about 45 miles an hour.

The cars were connected by a gangway built within the framework. On the top of the gas-chambers was a platform of aluminium alloy, carrying a 1-pounder gun, and used also as an observation station. It is thought that L1 was also provided with four machine-guns in her cars.

Later types of Zeppelins were fitted with a "wireless" installation of sufficient range to transmit and receive messages up to 350 miles. L1 could rise to the height of a mile in favourable weather, and carry about 7 tons over and above her own weight.

Even when on ground the unwieldy craft cause many anxious moments to the officers and mechanics who handle them. Two of the line have broken loose from their anchorage in a storm and have been totally destroyed. Great difficulty is also experienced in getting them in and out of their sheds. Here, indeed, is a contrast with the ease and rapidity with which an aeroplane is removed from its hangar.

It was maintained by the inventor that, as the vessel is rigid, and therefore no pressure is required in the gas-chamber to maintain its shape, it will not be readily vulnerable to projectiles. But the Count did not foresee that the very "frightfulness" of his engine of war would engender counter-destructives. In a later chapter an account will be given of the manner in which Zeppelin attacks upon these islands were gradually beaten off by the combined efforts of anti-aircraft guns and aeroplanes. To the latter, and the intrepid pilots and fighters, is due the chief credit for the final overthrow of the Zeppelin as a weapon of offence. Both the British and French airmen in various brilliant sallies succeeded in gradually breaking up and destroying this Armada of the Air; and the Zeppelin was forced back to the one line of work in which it has proved a success, viz., scouting for the German fleet in the few timid sallies it has made from home ports.

CHAPTER XI. The Semi-rigid Air-ship

Modern air-ships are of three general types: RIGID, SEMI-RIGID, and NON-RIGID. These differ from one another, as the names suggest, in the important feature, the RIGIDITY, NON-RIGIDITY, and PARTIAL RIGIDITY of the gas envelope.

Hitherto we have discussed the RIGID type of vessel with which the name of Count Zeppelin is so closely associated. This vessel is, as we have seen, not dependent for its form on the gas-bag, but is maintained in permanent shape by means of an aluminium framework. A serious disadvantage to this type of craft is that it lacks the portability necessary for military purposes. It is true that the vessel can be taken to pieces, but not quickly. The NON-RIGID type, on the other hand, can be quickly deflated, and the parts of the car and engine can be readily transported to the nearest balloon station when occasion requires.

In the SEMI-RIGID type of air-ship the vessel is dependent for its form partly on its framework and partly on the form of the gas envelope. The under side of the balloon consists of a flat rigid framework, to which the planes are attached, and from which the car, the engine, and propeller are suspended.

As the rigid type of dirigible is chiefly advocated in Germany, so the semi-rigid craft is most popular in France. The famous Lebaudy air-ships are good types of semi-rigid vessels. These were designed for the